1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

farther back in the mountains, in the second or third ridge; they drain a larger area, and are subject to sudden falls of rain; such water-courses will in certain seasons be filled for a time by a wide and swift river, discoloured with red mud in suspension, carrying down in this way, as well as by dragging sand along the bottom, large quantities of material from the hills to the lower grounds and to the sea.

These ravines are from a few hundred yards to a mile wide; they are bounded by a sudden bank, often cut into a river cliff of a hundred feet in height that shows to view the sandy and loamy strata. Their flat bottom is mostly sandy; it is sometimes covered in part with the long tufty jungle-grass called in these parts *khar*.

The plateaus between these ravines, though, as before said, somewhat dry, have in great part been brought under cultivation; here, as the crops depend entirely on the rain, their yield varies much with the years.

The tracts where the jungle-grass abounds are frequented by the black-buck or antelope, which indeed, encouraged by the game-laws of the country, spread into the cultivated parts and even herd with the cattle. Near these grassy tracts the villages are composed of pretty thatch-roofed houses; in India straw is never afforded for the purpose of thatching, it is all used as food for the cattle; indeed from the way the treading out the corn on the threshing-floor is carried on no whole straw is left, so it is only where some such material as that stiff grass can be got from the jungles that any thatching is done.

The 70-mile strip of plain extending from the Rávi to the Chináb is crossed by two large streams that deserve separate mention. These are the Ujh, that debouches by Jasrota, and the Tavi, that comes out of the hills by Jummoo. They are both rivers of perpetual flow and considerable, though much-varying, volume. They rise in the mountains at the back of the Outer Hills at an elevation of 13,000 or 14,000 feet, but not from hills of permanent snow; they have a course among the hills, the Ujh of some 50 and the Tavi of 80 miles, before they reach the

[i.e. in the plains of SOUTHERN JAMMU -- ANALYST]

1: Drew G-3 (1862-1872) 1875 AVI Kashmir A VI

through the various ridges into the plain which it traverses until it joins its waters to the Chīnāb. 133 X

As one approaches Bhimbar the plain country is more and more cut into by ravines; it may here be called a low table-land separated by them into sections; at the edges one sees how the soil is composed of layers of sandy loam with occasional pebbles. [134]

Opposite Bhimbar there appear on the south, in the British territory, the Khāriān Hills, a range a good deal like in structure and appearance to some of our outer hills, but quite out of the general direction of them, since it runs north-east and south-west; it may be said to belong less to the Himalayan system than to that of the Salt Range. Between these hills and our outermost range there still runs a narrow strip of plain, which for 12 miles west of Bhimbar is of that character just described, of ravines and low flat plateaus alternating. Beyond this, extending to the Jhelam, is a space of completely flat alluvial ground, little above the level of that river.

EASTERN DIVISION OF THE OUTER HILLS.

Recalling that this division is to include those which lie between the Rāvī and the Chīnāb, we will examine first the very outermost range. 133 X 137

The outermost hills of all belong to a ridge that, along the 70 miles between those two rivers, has the same characters. It rises from the plain with a regular and gentle slope of about 8°, that so continues till a height of some 2000 feet above the sea is reached; this slope is indented with many drainage valleys, not cut steep, but making undulations of the ground transverse to the run of the ridge. The surface of the hills is very stony; rounded pebbles cover nearly the whole of it, for the strata beneath are composed partly of pebble-beds. Still it bears vegetation; the hills are indeed clothed with forest; it is a close forest of trees 20 and 30 feet in height, mostly of two species of acacia and of *Zizyphus jujuba*,* with an underwood of the shrub called *Brenkar*,

* The native names of the acacias are *Phulāī* (*A. modesta*), and *Kīkar* (*A. Arabica*); the latter is called *Babūl* in Hindostan. The native name of the Zizyphus jujuba is *Ber*.

1; Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

133 X
137 which grows to the height of 3 or 4 feet, and has a white flower that gives out a sickly smell. Thus clothed the slope continues up to a crest. Beyond there is a sudden fall along the whole line of it, an escarpment formed of sandstone cliffs of some hundreds of feet of vertical height, below which again the ground acquires a lesser slope.

133 X This is the first range of hills; the gentle slope faces the plains, the cliff-slope abruptly ends it off on the inner side; the whole surface from the plains to the cliff edge is an expanse of forest, but beyond the crest the ground is too steep to bear it. The run of the range, as stated before, is interrupted by the valleys that lead out through it from the inner country; these are not wide, but in some parts they are near enough together to cut the range into portions of short lengths that make almost isolated hills.

Next within the outermost range comes a tract of very irregular broken country. It is a country of ridges and sloping plateaus, cut through by very small but steep ravines. The foundation of its character is the changing degree and frequently high angle of the dip of the soft sandstone rock. So varying is the form that it is difficult to conceive any general idea of it in the mind, but when the eye gets used to the hills it perceives that many of them are of one type; on one side is a long slope; on the other a steep escarpment, the former slope coinciding with the dip of the beds. Since this dip is often 10° or 15° there arise jutting plateaus of rock of a corresponding inclination, which end in vertical cliffs of the massive sandstone. From, probably, lateral changes in the character of the beds, each ridge or sloping plateau continues but for a short distance; as one dies away or disappears others rise into prominence, parallel may be, but not in the same line.

At another part the plateau and escarpment form is obliterated from the dip of the beds reaching to such a high angle as 45° may be; instead, there are equal-sided valleys bounded by jagged ridges; these ridges run at right angles to the strike of the beds, and not parallel with it, as did those of the other form; the

1; Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

133X the intervening flats, the curving of the ranges as their direction followed the changing strike of the rocks which constitute them—plainly as in a map; for a length of a hundred miles each separate ridge can be traced from this commanding spot.

133X To return to the part behind Akhnūr. The outermost range
137 is of pebbly jungle-covered hills sloping easily to the plains, but
311 showing a steep fall inwards; this escarpment is one of per-
361 haps 300 feet; it is succeeded at its foot by a plateau much cut through by ravines, so much so that the eye does not at once distinguish that the summits are indeed so far flat and so much at one level as to justify the name of table-land; its level must be quite 2000 feet above the sea; a good portion of it is of bare rock, the rest is covered with brushwood and has pine trees scattered; only here and there are bits of tilled land by which a small population is supported; the ravines cut through it to a depth of some hundreds of feet, making steep cliffs of sandstone rock.

133X Farther to the north the rock rises up from this plateau along a great length of miles with a slope of from 10° to 20°, coinciding with the dip of the beds, regularly for 1000 or 1200 feet, till a level of more than 3000 feet above the sea is reached; thus a bold narrow ridge is formed which continues regularly for many miles with but small indentations; the surface is in great part rocky, but still bears many trees of the long-leafed pine. The ridge is sharp and narrow; the farther slope is yet steeper than that rocky one; it is an escarpment properly and geologically so called, and a really fine instance of one; for 20 miles without a break it continues with a face of 1000 feet of vertical height, at a slope of in some parts 45°, in some rather less, everywhere marked by variations according to the alternate outcrop of beds of sandstone and of clay.

The name of this ridge is Kāli Thār, or Black Range, a name given on account of the dark hue it has in some states of the atmosphere when seen from a distance.

As we look from the summit of this towards the interior, we can learn about the character of the ground in the remainder of the breadth of the Outer Hills.

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

We see first, that at the foot of this escarpment stretches a flat valley one or two miles wide; this is one of the dūns, and probably it corresponds with that of Dansāl, on the other side of the Chīnāb.* This valley, though it may be called in a general way, and as compared with the ridges that bound it, a flat, is broken by lines of sandstone rock that project up; still a good part of it is cultivated in terraced fields; again, it is cut into, for the greater part of its length, by a great gully, narrow, 200 feet deep, that carries off the drainage to the Chīnāb River; farther west, however, the direction of the drainage alters, and the streams flow into the Mināwar Tavī.

Still looking from our escarpment-summit, we see that beyond the valley lie numerous low lines of hill, an alternation of narrow ridges and hollows, whose surface is mostly covered with brush-wood; these occupy some miles of width; behind them rise the bolder slopes of the higher mountains in rich dark colours, intermingled brown and green, backed by the distant snowy peaks.

West of the Mināwar Tavī, the ridges, plateaus, and hollows do not continue to correspond with those we have traced out; new ridges appear in the line of the valleys; others disappear; others coalesce. In fact, a new series of ranges has arisen, generally resembling those we have been looking at, but not individually representing them. By Bhimbar, what may be the continuation of Kālī Thār approaches nearer to the plains. Beyond, from the neighbourhood of that place and of Naushahra north-westward, extend several bold lines of hill, parallel ridges, with narrow hollows between them, themselves broken by lines of rock. These ranges are commonly 3000 feet high, parts of them rise several hundred feet above that, and so continue for a good distance; the highest point marked by the G. T. Survey is as much as 4391 feet.

While from the neighbourhood of Bhimbar such hills as these run with a regular direction to the north-west as far as our boundary

* On the supposition of this correspondence, the two spaces of the plateau and the Kālī Thār ridge together represent the much-broken ground and the successive ridges that we saw to intervene between the first range by Jummoo and the Dansāl dūn itself.

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

being in a synclinal, or perhaps a basin. Then, a few miles farther north, we come into irregular ground, made by low parallel ridges of sandstone; line succeeds line gradually rising in height, and so we find ourselves again among the marked ridges, the continuation of those before pointed out as extending to the north-west. 133x

The lower hills lately passed had such trees as those of the Jummoo jungle—the acacias and others, with the undergrowth of brenkar shrub; on the higher ridges is forest of long-leafed pine. [137]

So varied in form is all this ground that it is difficult to do more towards its description than this without going into such detail as could hardly be followed or remembered. I must be content to say that, up to a line running north-west through Kotli, we find those characters which have more than once been described; there are ridges composed of sandstone rock, sometimes gently sloping on one side and steep on the other, sometimes steep on both and sharp; some of these ridges continue for a distance, others quickly change or combine; between them are hollows, sometimes narrow, sometimes wider flats; lines of rock spring up, so to say, in the line of the valleys, and, increasing as one follows them, become in turn important hills; gullies or ravines that at this present time effect the drainage of the ground, the latest made set of hollows, now cross the lines of rock, now run parallel to them, at times but little below the general surface, at others cutting below it to a depth of a hundred or two feet.

As we approach the Jhelam, we find more sudden falls of the streams and steeper slopes of the hills, the comparatively low level of that line of drainage having induced a greater denuding power in the streams near.

All this makes a country curiously varying in its detail and almost bewildering, until the eye gets somewhat accustomed to its characters, and enables the mind to refer them to the causes that originated them—causes which cannot be here dilated on, but in a few words may be spoken of as sub-aerial denudation, acting on strata that have a generally persistent strike but an ever-varying dip, strata of different hardnesses, and in respect of that quality, subject to local changes.

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

often breaking off, seldom cease for the season without affording moisture enough for the bringing on of the summer cr[illegible].

The rains ending with September, the country is left dry for a time; its uneven form prevents the soil from retaining much moisture; by the drying of the country, and the decline of the sun's power, the cold weather is introduced. This is a delightful season—a pleasant bright sun and a cool bracing air make it one refreshing and invigorating after the dry heat of the first part of summer, and the warm moisture of the latter months. This bright cold weather is, however, varied by rainy days, which bring rather a raw cold; showers may be expected about the 20th of December, or between that date and Christmas time; and on the higher ridges, at 3000 and 4000 feet, snow falls, melting almost as soon as it falls. It is this winter rain that enables the peasant to proceed with the sowings for the spring crop, and on the occasional recurrence of such showers during the next three months he depends for that harvest which the increasing warmth of the months of March and April is sure to bring on well if the rain has been fairly plentiful.

The only part of the year at all unhealthy is the latter half of the rains; the natives date the beginning of it from the flowering of the rice; it may be said to extend through part of August, September, and part of October; during that time intermittent fever much prevails. The type of fever is somewhat worse than what abounds at the same season in the Panjáb; it is more of a jungle-fever, less regular in its times, and less easy to get rid of. In some years fever is exceedingly prevalent over the whole of this tract. I have heard that Ranjít Singh's father once took advantage of the inhabitants of the lower ranges being striken down with it to make a raid on Jummoo.

The vegetation of the Outer Hills is for the most part of the dry-tropical character.

The very outermost ridge, as before said, is covered with a more or less dense forest of small-leafed acacias (*A. Arabica* and *A. modesta*, called by the people *Kikar* and *Phulái* respectively), with some of the *Ber* tree (Zizyphus jujuba) intermingled, and an

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

137 undergrowth of the shrub *Brenkar*. This forest, which on the hills occupies a dry pebbly soil, sometimes spreads down on to the loamy ground of the plains; probably in former times it grew over a larger area of the plain, and has since been gradually cleared; the greatest space of flat ground now occupied by it is close below Jummoo, the forest having there been preserved by command.

Farther within the hills there is not such a growth as to make a forest; it is rather a straggling bushy scrub, partly of the same trees in a shrubby form, with Euphorbia (*E. Royleana*, or *pentagona*), which grows to a large size, and occasionally mango, pipal, banyán, bamboo, and palm (*Phœnix sylvestris*). The streams that flow in the narrow ravines among the sandstone hills have their edges adorned with oleander bushes.

The long-leafed pine (*Pinus longifolia*, whose native names are *chil* and *chir**), a tree whose needle-foliage is of a light bright green colour, is usually first found, as one goes inwards, on the north slope of the outermost ridge. I have found it there at the level of 1400 feet, but only in a stunted form. On the broken plateaus and dry hill-sides of 2000 feet elevation one sees fair-sized trees of it scattered about; at 3000 and 4000 feet, in favourable spots, one finds whole woods of it, but even these are not so thick and close as the forests of *Pinus excelsa*, which cover the higher hills. The highest range of *Pinus longifolia* seems to be 5500 feet, or it may be a little more.

241 Of cultivated plants we have in these lower hills nearly the same kinds as in the Panjáb, and over the whole area the same succession of two crops in the year. The winter crop, chiefly wheat and barley, is sown in December (sometimes earlier, and sometimes even later), and ripens in April; the summer crop of maize, millet, and rice, is sown in June and ripens in September or October. At one or two places (as at Syálsúi, near Rájaori) rice is raised by rain-moisture alone, but most generally it depends on irrigation. Plantain and sugar-cane, though not largely cultivated, grow fairly well, they have even been introduced into Púnch, which is 3300 feet above the sea.

* With the cerebral r.

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

large oblong space, enclosed by a thick wall, and traversed by two stone water-ways at right angles to each other. There are two bárádaris, that is, bungalows or summer-houses, one of which overlooks the stream, and looks on to the picturesque old town on the opposite bank. In former times there was a bridge leading across from the garden, as one can tell from some remains of its piers; though the stream is usually fordable at certain places, it is at times rendered quite impassable by floods. At the corner, again, are some hamáms, or hot-bath houses.*

There is a saráe, which doubtless was used by the king's followers, on the right bank of the river, in the town itself; this is now occupied for permanent dwellings.

A few miles above Rájáori are two quadrangular buildings, one 50 yards square, the other 50 yards by 40, which are of the same time; these, however, are of another sort, they are simple enclosures with two entrances, and without any cells; very likely they were for stables.

At *Thanna* is a fine example of the Mughal saráe (as these rest-houses, the work of the Delhi Kings, are called); in this, I think, the rooms are larger and higher than is usual, but fewer in number.

After this a stage is missed, where I do not know of any like remains, though I think there must have been some. The next is the high village of *Poshiána*. Here are some remnants of a saráe that was not so well finished as those lower down, nor of such a size; for here there is not much flat space for any building; there is little room even to pitch one's tent.

Across the Panjál Pass, by the roadside, are a few small shelter-houses, consisting of two or three arched cells, which must often have been of service to wayfarers, who might, by making the journey too early or late in the season, expose themselves to the risk of a snow-storm. Soon after these we came to *Allábád saráe*, which is one of the few of those that still are used for the original purpose of shelter for travellers. In its bleak position, at an

* In this garden are some fine chinár or plane trees; the altitude, about 2200 feet, seems the lowest at which they will flourish.

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

Outer Hills. These were shown to be ridges more or less parallel, separated by flat valleys, sometimes narrow sometimes wide, with the main lines of drainage cutting across, that is, through, the ridges. On the other hand, the Middle Mountains are ridges of varying, irregular, direction, that branch again and again, like the twigs of a tree; the chief ridges are at the same time the more important watersheds.

Looking from a geological point of view, we may say that there is not the same correspondence between the direction of the ridges and the strike of the beds as there is among the Outer Hills.*

The elevation of these Middle Mountains is sufficient to give a completely temperate character to the vegetation. Forests of Himalayan oak, of pine, spruce, silver fir, and of deodar, occupy a great part of the mountain slopes; the rest, the more sunny parts, where forest trees do not flourish, is, except where rocks jut out, well covered with herbage, with plants and flowers that resemble those of Central or Southern Europe.

Cultivation has been carried to almost every place where it is practicable. Wherever, within the altitude that limits the growth of crops, the slope of the ground has allowed of it, the land has been terraced, and narrow little fields have been made, these settlements sometimes being of extent enough to support a village, sometimes sustaining but one or two families.

Here, as in the Outer Hills, the tillage does not depend on irrigation, but on rain; these mountains, indeed, get the best of the Monsoon or rainy season; it is seldom that they suffer from drought, more often they suffer from an excess of downfall. Still the rainfall is not enough for the growth of rice; for this irrigation is wanted, but only in a few places can it be obtained; hence that crop is comparatively rare.

It is only in the very lowest parts of this region that two crops can be got from the same land. The times of growth of the two kinds of crop—of wheat or barley on the one hand, and of maize, rice, or millet, on the other—in most parts overlap each other to

* This outbreak is noted, with regard to a similar tract further east, by Mr. H. B. Medlicott, in 'Memoirs of the Geological Survey of India,' vol. ii., part 2, p. 6.

1; Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

243 an extent which varies with the height above the sea. Hence the wheat does not ripen till it is too late to sow maize or millet. But some land being reserved for the first kind of crop and some for the other, they have, in a sense, two harvests.

132 Snow falls over all the tract. In the lower parts it just falls and melts; but in most it stays for months, and in some as long as five months. It is this circumstance of duration of snow that causes great distinctions between the inhabitants and the customs of these hills and of the Outer Hills, some details of which will be found farther on.

The further account of the region can best be given by taking for examples and describing some of those parts which I am most acquainted with.

RAMNAGAR TO BHADARWĀH.

133x A march from Rāmnagar to Bhadarwāh, Kishtwār, and beyond, gave me an opportunity of seeing much of this mountain tract.

Near behind Rāmnagar, which itself is counted in the Outer Hill region, rises a bold ridge. This, which can be traced on the large map, is the first of the Middle Mountains.

The road or path over it—one not fit for horses—rose up a long spur that projected from the ridge, till we crossed this at a height of about 8000 feet. The range keeps at this elevation and continues straight for some 25 miles. On the south side it has a succession of such spurs as the one we came up; they first jut out from the ridge at a low angle, then, leaving a high shoulder, the slope becomes more sudden; lower down again it changes to various degrees of steepness, which allow of the ground being in places terraced for cultivation. Between every pair of the rounded spurs is a hollow or ravine, each the bed of a stream of no great volume, but perennially flowing.

133x 137 The surface of the ridge and of the spurs changes. Rocks here and there project; the less steep portions are covered with pasture when facing the south, and with forest on the sun-sheltered slopes; the forest may be of oak, with rhododendron and horse-chestnut among it, or, higher up, of deodar and pine.

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

From the summit of this ridge, looking northwards, we see across the upper valley of the Tavi on to another ridge of fine massive mountains, rising to rocky but not sharp-pointed peaks, which are 10,000 and 12,000 feet in height. From this range come branches bold in outline; upon them can well be seen the alternation of forest and pasture land, and the sharp ending of the trees along the central line of each spur, where the aspect of its two slopes with regard to the south differs enough to produce that effect on the vegetation, the growth of wood always keeping to the more shady part. The general look of the hills reminded me of the Black Forest of Germany, of its darkly-wooded slopes and bare summits of the higher mountains.

A path led down into the valley of the Tavi River through a fine forest of spruce and silver fir (*Picea Webbiana*), and deodar trees, with sloping glades of fresh grass, dotted with the young trees in such fashion that one might have thought one was in a well-cared-for shrubbery.

In the valley we came to a village named Thilrû, on a plateau about 200 feet above the level of the Tavi River, surrounded close by the hills, and shaded by walnut trees; this is at a level of about 6600 feet. In the deep channel below the river foams along among large boulders, confined by rocks that are capped with a deposit of alluvium of rounded blocks of gneiss embedded in earth. These banks are in part clothed with shrubs and trees that have found a footing upon them. Just opposite a beautiful little cascade is made by a side stream jumping in stages down the chasm it has worn for itself in the rock that confines the larger river.

The General Map will show that the two ridges—the one we crossed over, and that on the north side of the Tavi Valley—come round and join some 10 miles above the village of Thilrû, and that the river rises in the space thus enclosed. Our way was to follow up the stream to its head, and, coming the watershed, to drop down on the other side to Bhadarwâh.

The path, which kept the valley, was among deodar, silver fir, and spruce fir, with some pines of the species *Pinus excelsa*; each of these showed to perfection the beauties of their foliage; the

1; Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

pine-needles hung in light feathery sprays, the spruce boughs in graceful curves, with which contrasted the almost geometrical regularity of the silver-fir branches. The deodar is here, and wherever on the Himalayas I have seen it, much more like a Lebanon cedar than the trees, still young, growing in England would lead one to suppose; the bending form of the boughs, as well as the particular light tint of green of the leaves of the young plant, are lost as the tree gets on in age, and the branches come to jut straight out and to make flat dark-leaved layers.*

Following up the valley, often we met with the river roaring among boulders and over rock-ledges; anon the path crossed it by a bridge, and rose on the right bank for some 1500 feet, and afterwards went along high above the stream. Here we came upon snow. It was the beginning of May—hot summer in the Plains and Outer Hills, spring in the region just past, but we came, as it were, to winter in rising. Across the valley we looked on to a snow-clad slope of some 4000 feet of height, whose summit was a rock-mountain of 13,500 feet. The lower half of that slope was covered, in lines following those sides of the indenting hollows whose aspect was favourable to forest trees, with thousands and thousands of tall straight conifers in dark green foliage, that threw their grey shadows over the bright snow. As the path led on and the valley rose, the bank that faced us becoming nearer, we saw each tree to stand in a hollow in the snow, for this being old, not of a late fall, had both quitted the branches and melted from around the trunks, though still thickly carpeting the space between. On the north side of the valley we were able to find a clear space for the tents to be pitched, the altitude of this camp being 9500 feet.

We had now reached ground of somewhat different character; we had come to a part which the natives call Sooji; it is the

* The names which these trees here bear are—silver fir, *rás*, or *res* (with a nasal *s*); spruce fir, *tos*; Pinus excelsa, *chil*, or *kadlir*; deodar, *dyár*. I think that the names *rás* and *tos* become interchanged not very far off. Dyár is the name used for deodar both in the Punjáb (where its wood is well known) and in these hills; but in Kashmír it is called *dewár*, the *e* being pronounced, according to the rules given in the preface, like the *e* in the English word "deity."

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

upland space enclosed by the meeting of the ridges, where the Tavi has its source. At this high level there is a spread of gently undulating ground, with rounded knobs and smooth dells, a space pleasant to meet with after the steep slopes and narrow valleys. The higher hills had retired. As one viewed them from the top of some of the mounds, one saw a great difference in the look of those on the north from what we had seen on the south side of the valley. On the north was an amphitheatre made by rugged mountains of grey rock with snow-fields beneath; below the snow the amphitheatre enclosed a thick forest of alpine oak. This I saw when the evening sun was brightening the rounded masses of its foliage, from the midst of which rose here and there the straight forms of some dark fir trees.

The oak, *Quercus semicarpifolia*, in the native language *kreû*, is at this point the highest forest tree. Unlike the conifers, it flourishes on hills that have a south aspect; it grows certainly as high as 11,500 feet, and I think it reaches to close on 12,000 feet; of the firs the limit was only a little above 11,000 feet.

The depth of snow prevented my verifying the thought which came to me on seeing the undulating hillocky ground of this enclosed upland, namely, that the irregularities of its surface were the moraines and *roches moutonnées* of former glaciers. The end of May or June would be the time to follow up the inquiry, as the snow by then would have melted. The stream which we had traced up now divided. I was told that the southern branch came from a little lake called Kalli Kund. This strengthens the idea of glacier-traces, for mountain-lakes have often been caused, in one way or another, by the action of glaciers.* The G. T. Survey have marked the highest summit near—that at the meeting of.

* What appeared to me to be other signs of former glaciers, not very far from this, are the masses of rock which lie in lines in the Bhadarwáh Valley. The large blocks, mostly of gneiss, are sometimes as much as 40 feet long and 25 feet high; they are among an agglomeration of angular and rounded pieces of gneiss and slate. The heaps of the larger masses are seen to be arranged in curving lines, as the side valley they came from bent round to join the main one. I am not quite sure of their being moraines; avalanches perhaps may have had to do with forming them—avalanches of the kind that later on, under the head of Flicker, will be described. The linear heaps extend below the level of the town, to, say, 3800 feet above the sea.

1a Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

the ridges—as 14,241 feet; it does not bear perpetual snow, but there is a very constant bed near, whence snow is sometimes sent for summer consumption to Jummoo, after being compressed by beating.

The other branch stream we followed to its source. The way led us to a part of the ridge that was depressed, when a few hundred feet of steeper ascent brought us to the Pass, which is 10,900 feet above the sea. The ridge it crosses bears the name of Seval Dhâr. This Pass is closed by snow for three months from the middle of December; later in the season than we came it would be practicable for ponies, which, however, would have to be taken up the valley by a somewhat different road than ours.

The gaining of the summit opened to us a magnificent prospect as we looked beyond. On the right was the high peak, on this aspect brilliantly white with snow; from this mountain juts out a mighty spur, whose sides, that descend full 5000 feet, are clothed most thickly with fir forest. Spurs from other parts of the range make long ridges with dividing valleys; their sides, though not rocky, are steep-sloped, some parts of them grassy, some parts dotted with trees, and some completely covered with wood. Where these spurs end off, runs along nearly at right angles to them the Bhadarwâh Valley, a flat gently sloping to the north-west. The town and village that occupy it are in sight. Beyond that again rise hills like what we have near us, dark forest ridges, their spurs part grassy, part wooded. These are branched in such complication that their connection cannot be made out except by studying a map of them. Last beyond—seen clear over these ridges, stretching far right and left along the whole of the space visible between the near jutting hills—is a great snowy range, the one dividing Chamba from Pângi, the continuation of which reaches to Kishtwâr. It is a serrated rocky line, with wide snow-fields in front of it, part of which is permanent snow. Some lofty sharp-pointed peaks rise from the general level of the range; of these one has much the form of the Matterhorn. The higher mountains of this ridge measure 17,000 and 18,000 feet.

Down from the Pass was first a steep descent, which the snow

1: Drew G-3 (1862-1872) 1875 AVI Kashmir AVI

made difficult for the laden men, and then a more gradual slope along a spur, through a forest of the same sorts of conifers. The spruce and silver fir flourish most in the high parts, while lower down the deodar and *Pinus excelsa* are most numerous. The trees, as a rule, run to a height of 100, 120, and 150 feet; many are wonderfully straight. In the descent of several thousand feet such as we were now making the changes in all kinds of vegetation are very striking; first below the snow were great bunches of different sorts of primulas; these farther down gave way to other flowers of great variety; deciduous trees gradually became more frequent, and with their fresh spring colours among the dark foliage of the conifers gave new beauty to the forest.

BHADARWAH.

When we had descended more than 5000 feet we reached the valley of Bhadarwáh. This is a nearly flat-bottomed valley, a mile in width; in length it extends thus open for about four miles, above and below narrowing so as to leave hardly any space between the hill-slopes. The hills which bound it are the ends of spurs from the forest ridges. Some of these spurs have bits of cultivated ground at different levels, and in some places we noticed traces of former cultivation—terraced ground overgrown with young pines, of twenty years' growth or more.

The valley-bottom has a slope of about 3°. The land is terraced to this fall in steps of a few feet each, so as to fit it to receive the irrigating water that here is plentiful enough to provide for a crop of rice. For this, in the month of May, the people were busily preparing, both by ploughing and breaking up the ground with a heavy kind of hoe or mattock. Men and women combined, in gangs of ten or a dozen, were working over the fields, shoulder to shoulder, striking in regular time, and beguiling the hours by singing as they worked a monotonous but not unpleasing chorus. The process that follows—and this, being lighter labour, has not the same accompaniment of song—is pounding the clods with what are exactly like croquet-mallets;

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

summits; nothing that could be called a table-land ever occurs. The slopes of these are often covered with fir forest, with the usual succession of species according to the elevation—spruce and silver fir at the very top, giving way, when one has descended 1000 or 2000 feet, to *Pinus excelsa* and deodar, and lower still, at about 5000 feet, to *Pinus longifolia*.

From the height of 6000 or 7000 feet downwards, one meets with scattered patches of tilled ground and with the isolated cottages or huts of the owners. Here and there, on the frequented roads, the houses are collected into a little village that boasts of a shop to supply the simplest wants of travellers.

All the space between the ridge and the river is taken up by such spurs alternating with ravines; the vertical distance is some 7000 feet, the lower part of the slopes, that which overhangs the river, being often the steepest.

The Chīnāb is one of the great rivers of the Panjāb. It rises in the country called Lāhol, in two streams, the Chandra and the Bhāga, the joining of whose names into Chandrabhāga make the word by which the combined river is often known among Hindūs. The other name, Chīnāb, which is more usual, has, I think, the derivation that is so obvious and is commonly given to it, namely, Chīn-āb, the water of China, which name probably was given by the Muhammadans from a notion—by no means far from the truth—that it came from Chinese territory; for the sources of the river are very near to ground that was tributary (though by two removes) to China, and the tract it first flows through is inhabited by the Lāholis, who are allied to the Chinese in speech, look, and religion.

The river after leaving Lāhol (which is now under British authority) passes through Pāngī, a part of the Chamba territory, and enters that of Jummoo in the district called Pādar. From its entrance into this onwards it flows for 180 miles through such country as we have been describing—some more detail of which remains yet to be given—and then for 25 miles through the Outer Hills, before it debouches into the great plain.*

* Details of the course and volume of this river will be found at p. 117 of Cunningham's 'Ladak.' [SEE SOURCE 1: CUNNINGHAM, AJ4, W. Tibetan ANALYST]

1: Drew G-2 (1862-1878) 1875 AVI Kashmir AVI

winter. I hear that snow gets to be 3 feet deep and stays 4 or 5 months, and that there is a good chance of it falling at unseasonable times besides. This and a want of sun make it difficult for the crops to ripen. The sunshine is intercepted, not only by the clouds that the mountains attract, but also by the mountains themselves, which shut in the valley so closely. At Athuli I found that the average angular elevation of the visible horizon—that is, of the mountain-summits all round—was 18°. This want of sunshine affects the fruits, which do not well ripen, though some fruit-trees, especially walnut trees, are common.

Pádar is one of the few places where I have met with the edible pine, *Pinus Gerardiana*; it is a large spreading tree with smooth bark; scattered individuals of it are found in the forest.* Wild carraway grows here, and is gathered in quantities to be carried to Jummoo for sale; the price in Pádar is about eightpence a pound.

The district we are now in is one of those where deodar forests occur in such positions as make it practicable to fell the trees for timber for use in the Panjáb. The necessary condition is that the slope on which the trees grow should be so near a large stream that without an extreme amount of labour the logs can be moved or slid, without [illegible], where they will float away down the stream.

Since the beginning of British rule in the Panjáb the demand for deodar timber has been great. No tree grows in any quantity in the Panjáb which will produce beams fit for a large building. Hence in former times to some extent, but still more since the British came there, the Panjáb has called on the Himalayas to supply it with timber; of all the Himalayan trees the deodar has been proved to be the best to resist the destructive insects, especially the white ants, which abound in the plains.

In the course of years the most favourably situated deodar forests in the Chinab Valley have been felled, and there now remain chiefly trees which either are of a less girth than can be

* The only other part where I have found this tree is near Dáyián, in the Astor country, as mentioned in Chapter XVII.

Ti Desc G-8 (1863-1872) 1871 AVI Kashmir AV1

I must not have mentioned the rudus moraines, produced by old glaciers, in the main valley a little higher up than Hamtet, with grooves on the gneiss rock running in the direction of the valley; this is about 300 feet above the river and 9200 feet above the sea.

The highest village of any size in the Bhotiá valley is Marbal, two marches, or 22 miles, from Atholi. At Marbal Bhotis predominate, though there are a few families of Hindús. The Bhotis seem to have been for long settled in this upper end of the valley. Marbal is 9700 feet above the sea; the highest inhabited place of all is Sonjám, half a march beyond Marbal; here is but one household of Bhotis, a hardy family; they are confined within doors by the snow for seven months in the year. We were there on the 7th June and the snow had melted from the fields about a month before.

We had noticed, as we ascended the valley, that the vegetation gradually diminished; at Marbal the mountain side had become much lower; there were some stunted deodars, but at a height of 9000 feet the growth of that tree altogether ended; spruce and silver fir continued further; birch, which had at first appeared at 8000 feet, grew higher than all the others. The last limits of forest trees that I observed still above the valley were 12,000 feet for silver fir and 12,200 feet for birch, but this was counting the last straggling trees.

At Sonjám, 11,000 feet, they sow wheat, peas, buckwheat, and the kind of barley called *grim*, the grain of which becomes loosened from its husk like the grain of wheat, which I shall hereafter call "naked barley." Often the wheat does not ripen, but they sow some every year for the chance. Sometimes the whole harvest fails, and then they have to go to the Kishtwár country for grain, taking down sheep to exchange.

Beyond Sonjám is nothing but a waste of streams and bare mountains, of glaciers and of snow.

Middle Mountains of the West.

West of the meridian of Jammu, as has indeed been more than once said, these mountains have not such a wide area, nor

1: Drew G-3 (1862-1872) 1875
AV1 Kashmir AV1

nearly from 9 to 15 miles. We shall divide the distance into 900 sections according as the characters of the country change.

JUMMOO TO AKHNUR: ONE MARCH.

The length of this stage is 18 miles; it is a long march, 133* especially for a first day's, and it might be conveniently divided into two; Nighaut at 7½ miles would be the intermediate halting-place. The road, however, is easy, being altogether in the plain. For the first few miles from the city we pass through a narrow [137] lane cut in the acacia forest, the lane bounded by tall hedges of [136] *Euphorbia*. The forest abounds with wild pig; passing along at dusk one is sure to see several in the path, and there are spotted deer about, but they are shy and one does not often catch sight of them. Emerging from the forest we find ourselves well clear of the hills also, with the view unconfined by the lower ranges. We see in one glance a great length of the mountains that lie between us and Kashmir extending on the right; the look of them varies something with the time of year; I have made the journey oftener than once, and in different months; we will suppose it to be May, when the heat of the plains and of Jummoo has become [132] [illegible] air of the mountains.

In May, then, though the lower snow has melted, there remains much on the Punjál hills. High up spread fields of white snow, with both rocky peaks and snowy cone projecting from them. In front of them are the dark forest-slopes of the Middle Mountains, which are well seen in the opening of the Chinab and Ans valleys. The outermost low ridges clothed with green make the foreground.

The road goes on, a well-frequented one traversed by both [341] carts and camels; we pass over a fairly cultivated plain, rather dry in soil; we go by some Government gardens and a few hamlets and villages. As we near Akhnúr we come on the line of an [653] important canal the Maharaja is having constructed to bring the waters of the Chinab to the foot of the Jummoo hill. While we were three or four miles away from the foot of the hills the soil

2a Drew G-3 (1862-1872) 1873 AVI Kashmir AVI

of hills, such as we have all along called the "Middle Mountains"; at Thanna we have reached to the foot of the slope of the Ratan Ridge itself. 133 417

In the march from Thanna to Barangalla we go over the Ratan Pir.* It is a good steep pull to reach the summit, which is 8200 feet above the sea; there is hardly any depression in the ridge at that spot. On some of the slopes the mountain is thickly covered with forest, a forest of much variety and beauty. Box grows here largely; it is cut and sent to the towns, where it is mostly used for making combs. On the higher parts of the ridge one meets with numbers of the great black and grey monkey, called *langúr*. [36] [37]

From the Ratan Pir one looks north and north-eastward on to the Panjál Range, and obtains grand views of its mountains. The descent also gives beautiful prospects, both of near forest views and of the more distant hills. The road is rough and difficult; one's pony, that was useful for the ascent, had best be allowed to go down the hill without a rider.

Barangalla, which is the halting-place, is in the valley of the stream that rises near the Pir Panjál, and with many others goes to form the Pinch River. It is shut in closely by spurs of the hills. The next march, from Barangalla to [illegible], is along the bottom of the narrow valley, among the large rounded stones of

* In these hills the word *Pir* has come to be used more or less generally for Pass. The history of the employment of this meaning I conceive to be this. *Pir* in Persian means first, old, or an old man, and thence a saint or *fagir*. It is common for *fagirs* to establish themselves on Passes for the sake of contemplating the works of God and of receiving the alms of travellers; when any noted holy *fagir* died on a Pass, the place became sacred to his memory, and was often called after him, his title of *Pir* being prefixed; at last it became so common for every important Pass to have a name beginning with *Pir* that the word acquired the secondary meaning of Mountain Pass. 792 771 103

Ratan Pir must be called so after one Ratan, which is a man's name among the Hindús. As to Pir Panjál, the latter of the two words is applied to a great mountain ridge, at all events to the one we are coming to, I am not sure whether it is a general word for a range in any language. Pir Panjál now means simply the Pass of the Great Range. There was, however, at one time a *fagir* who lived on it and bore the title of Pir. Bernier, who crossed in Aurungzeb's time, says there was a hermit on the Pass who had resided there ever since Jehángír. Bernier wrote this in 1665. Jehángír reigned from 1605 to 1628; by this the hermit would have dwelt there thirty-seven years at least. I imagine it was from him that the Pass acquired the first word of its present name.

Is Drew G-3 (1863-1872) 1875 AVI Kashmir AVI

the stream-bed. The hill-sides are too steep for the road easily to be made along them, so the traveller must keep close to the river, which has to be crossed about thirty times, as it nears alternately the right and left bounding cliffs. A series of little wooden bridges are prepared, which are good enough for foot-passengers and for an unladen horse, but ought not to be ridden over.

At last we leave the bottom of the valley and rise by a steep ascent on the north, of some hundreds of feet, to Pushkána. This is a small village, the highest in the valley; it is inhabited by Kashmírí.

The march from Pushkána to Allábád leads us over the chief Pass. The road first contours to the base of the valley; from there the rise to the Pass may likely at this time of year—the latter part of May, we will suppose—be made by keeping in the ravine, on the snow-bed that now fills it. If this has melted, one must rise on the left and keep the narrow path which goes along the hill-side at some height above the bottom.

In rising to the level of the Pass, which is 11,400 feet above the sea, we go through the stages of fir and birch wood, and come to where the slopes are grassy, and the hills above are of rock and fallen stone with [illegible] unmelted.

One time that I came here I found the Pass, and the ground and the snow for two or three miles' distance, strewn with dead locusts, which about the middle of May had been destroyed by the cold in an attempted invasion of Kashmir.

Between the Pass and Allábád there intervene some miles of a very gradual descent. From Allábád to Hirpúr, the next stage, the road makes an irregular descent of more than 2500 feet, over rough, and in wet weather slippery, ground. The hills rise up boldly from the bed of the stream (which here, of course, flows towards the valley of Kashmír) for some thousands of feet. Often broken by rock and cliff, elsewhere covered by forests of pine, spruce, and silver-fir, they rise above where these can grow and show an unusually great extent of ground covered with birch-

2: Drew G-3 (1862-1872) 1875 AVI Kashmir AVI

trees; above this are the grassy summits of the spurs as visible from below; one must rise on to the spurs, and trace them back away from the valley, to get to the region of stone and rock, which would be reached at about 12,000 feet altitude. 133* 137 487

The stream, which flows a little north of east, receives other mountain-streams from both sides, and becomes an unfordable torrent. Descending and crossing it by a bridge, we come to comparatively level ground, clear of the steep mountains. For the next few miles our way is along a charming woodland path where the ground is covered with wild flowers, among them violet, strawberry, forget-me-not, and buttercup, and the fir-wood is varied with many trees and shrubs in bloom.*

The hills on each side get lower, and as we near Hirpúr we find ourselves between what, as compared with the mountains, are mere banks that frame, rather than confine, the view, and let us see a portion of the long-looked-for country of Kashmir. 133* 487

But a small part of the vale itself appears; we look across it on to the complicated branched mass of mountains connected with the great snowy range that bounds Ladákh. One knows not how to call it a wall of mountains or crested ridge or rugged edged mountain-mass; none of these express what one sees if after the first glance one looks, when the light may favour us, carefully to find out the details of what comes to view. The nearest spurs are 23 miles off; they can hardly be distinguished from out the mass, though they project far in front of it. Behind them, nearly 40 miles off, is a distincter mass of dark mountains which are some 12,000 feet in height; their projecting spur-slopes and the ravines alternating with them can even at this distance be made out. Above this dark mass we see a great extent of pure white snow-covered ground, from out of which rise great snowy peaks. One of these that stood prominent was 50 miles away, and some points within our view were nearly 70.

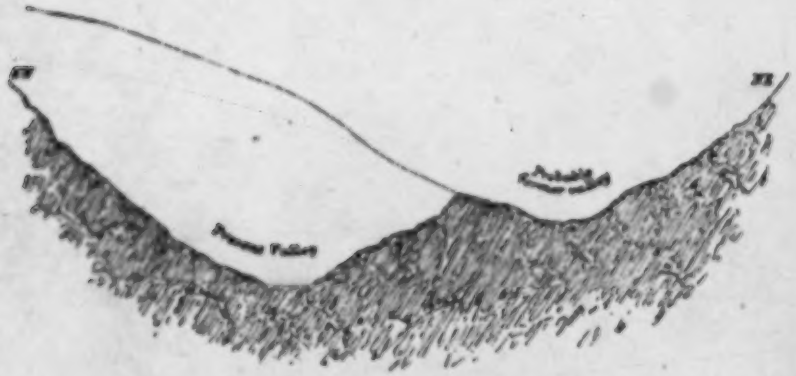
This was the first great view of Kashmir. But when we

* It is a remarkable fact—one that has been noticed by Dr. Falconer and Dr. Thompson—that on the Kashmir side one does not meet with the oak and rhododendron, although the elevation of the ground corresponds to that where, on the outer side of the Panjál hills, those trees are abundant.

1: Drew G-8 (1862-1872) 1875 AV1 Kashmir AVi

133x Where the Ratan Ridge first branches from the chief one, it
consists, in the same way as what it branches from, of rocky ridges
• 137 and peaks; farther out it becomes half stony, half grassy; farther
on still it is a straight ridge, rocky only at top, the slope wooded,
while some of the slopes and the more level places near are
covered with fine velvety turf, and have scattered all over them
innumerable flowers, as primulas, ranunculus, anemone, and poten-
tilla. The hollow between this and the main Panjāl Ridge is the
head of the valley that leads down to Pūnch.

133x There is a peculiarity in this valley which, though minute in
itself, deserves notice for the history of which I think it is a
record. On the north side there is a line of gentle hollows and



SECTION ACROSS VALLEY, BETWEEN THE PANJĀL AND RATAN RIDGES.

little plains at high levels, some hundreds of feet above the
deeper valley. These hollows are bounded by a little ridge with
a steep fall on the farther side. This will be better understood
from the woodcut, which represents a section across the valley. It
seems to me to show that a change has occurred in the system of
drainage; that formerly the southern slope of the valley was
where the dotted line is drawn, and that the upper hollow was
then the valley bottom; that for some cause, originating higher
up towards the head, the deepening of the valley did not occur in
the same line as before, but was made to one side.

The next place where I have crossed the Range is at the

1; Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

may often be convenient to make this first stage from Sirinagar by that mode of conveyance, especially as the greater part of it can be got over during the night. 505

From Gándarbal the road onwards keeps at a higher level, on an alluvial plateau that lies between the low plain watered by the branching streams and the hill-side. As compared with that watery flat, the plateau rises as one goes on till, in five or six miles from Gándarbal, it has reached a level 300 feet higher. Here and there it is cultivated, but for the most part it is covered with a brushwood jungle, with many half-wild fruit-trees scattered over it. Soon we have to descend the 300 feet from that plateau and cross the river. A few miles more, and we reach the next halting-place Kangan, where we are quite within the Sind Valley, and out of sight of the open vale. 133x

Now, in the next two marches, a distance of 25 miles, we enjoy the finest scenery of its kind in Kashmir; this kind does not, indeed, give us wide views across a hill-surrounded plain, but it shows us all the beauties of a valley bounded close by lofty hills of varied surface—richly clothed with forest or covered with thick herbage—broken by cliffs, and crowned with rocky peaks.

The valley-bottom, a mile or two in width, is occupied by plateaus, slopes, and low-level flats, which alternate one with the other. These spaces are in part river-alluvium, and in part belong to the alluvial fans of the side streams, often where more than one have coalesced. The river flows through the low land, frequently dividing so as to make islands of alluvium, on which grow groups of fir-trees. Of the plateaus and the fan-slopes the whole surface is covered with verdure, and it is chiefly upon them that occurs the cultivated ground.

The mountains rise steep behind the terraces and the fans. On the left bank, for 15 miles without a break, there is a great slope, extending up for thousands of feet, covered with dark forests of silver-fir, spruce, and *Pinus excelsa*, with some deodar; here and there lines of lighter green occur, in the hollows maybe, where the conditions are more favourable to the growth of 133x 137

1: Drew G-3 (1862-1872) 1875 AV1 Kashmir AV1

133* deciduous trees; along the lower edge, too, a growth of them
137 made a belt of brighter green beneath the dark conifers;—

"Up-clomb the shadowy pine above the woven copse."

133* For 5000 or 6000 feet up, this forest continues along that whole length of 15 miles; in some parts it reaches to the very summit of the ridge, in others the mountain rises above the tree-limit, and there is then a belt of green pasture above the forest, and above that rocky peaks and beds of melting snow.

On the right bank, the north side of the valley, the aspect of the hills is different. Their southern outlook does not favour the growth of wood. For a great height up, their sides are of steep but grassy slopes, broken by rocks and lines of cliff. Still at every mile they show new forms, as, in going along, one opens the successive ravines, and one's view reaches to the higher parts, to the lofty precipitous rocks of the centre of the ridge.

361 Besides these grand beauties of the mountains there are more homely ones in the valley. ⅄ The path lies through glades shaded by trees of rich and varied foliage, with flowers of jasmine, honeysuckle, and rose delicately scenting the air; it passes by villages which are surrounded by and almost hidden in groves of thick-leaved walnut-trees. Each village grove cheers one by its homely, pleasant, look, and each wilder glade tempts one to stay and enjoy in its shade the combined beauty and grandeur of the mountain views.

132 The atmosphere of the whole of this valley is distinctly cooler and fresher than that of the Kashmir Vale. On one's reaching Kangan the difference is already discernible; the heats that sometimes oppress one in Sirinagar are there left behind. The stream that flows in the valley is one of much volume and velocity, and its waters are always cold from the snow and glacier-ice that it drains from; the road crosses it several times over wooden bridges; as one stands on these one feels a current of cold air, air that has been dragged down from the higher parts by the water, and is kept cool as it flows by its contact with the stream, to which it is closely confined for not a yard beyond its banks does the current extend.

⅄ [i.e. the Sin... A...lyst]

3: Imperial Gazetteer G-3 (1889-95) 1909 AV1 Kashmir AV1

On the west and wherever the mountain-sides are sheltered
from the hot breezes of the Punjab plains, which blow across 133
the intervening mountains, there are grand forests of pines and 137
firs. Down the tree-clad slopes dash mountain streams white
with foam, passing in their course through pools of the purest
cobalt. When the great dark forests cease and the brighter
woodland begins, the banks of the streams are ablaze with
clematis, honeysuckle, jasmine, and wild roses which remind
one of azaleas. The green smooth turf of the woodland glades
is like a well-kept lawn, dotted with clumps of hawthorn and
other beautiful trees and bushes. It would be difficult to 133
describe the colours that are seen on the Kashmīr mountains.
In early morning they are often a delicate semi-transparent
violet relieved against a saffron sky, and with light vapours
clinging round their crests. The rising sun deepens the
shadows, and produces sharp outlines and strong passages of
purple and indigo in the deep ravines. Later on it is nearly all
blue and lavender, with white snow peaks and ridges under
a vertical sun; and as the afternoon wears on these become
richer violet and pale bronze, gradually changing to rose and
pink with yellow or orange snow, till the last rays of the sun
have gone, leaving the mountains dyed a ruddy crimson, with
the snows showing a pale creamy green by contrast. Looking
downward from the mountains the valley in the sunshine has
the hues of the opal: the pale reds of the *karewa*, the vivid
light greens of the young rice, and the darker shades of the
groves of trees relieved by sunlight sheets, gleams of water,
and soft blue haze give a combination of tints reminding one
irresistibly of the changing hues of that gem. It is impossible
in the scope of this article to do justice to the beauty and
grandeur of the mountains of Kashmīr, or to enumerate the
lovely glades and forests, visited by so few. Much has been
written of the magnificent scenery of the Sind and Liddar
valleys, and of the gentler charms of the Lolāb, but the equal
beauties of the western side of Kashmīr have hardly been
described. Few countries can offer anything grander than the
deep-green mountain tarn, Konsanāg, in the Panjāl range,
the waters of which make a wild entrance into the valley over
the splendid cataract of Arabal, while the rolling grass mountain
called Tosh Maidān, the springy downs of Raiyār looking over
the Suknāg river as it twines, foaming down from the mountains,
the long winding park known as Yusumarg, and lower down still
the little hills which remind one of Surrey, and Nilnāg with its
pretty lake screened by the dense forests, are worthy to be seen.
As one descends the mountains and leaves the woodland

3: Imperial Gazetteer G-3 (1889-95) 1909 AV1 Kashmir AV/

133

the interesting question, whether Kashmīr was once covered by a great lake. In this discussion the *karewa* already described plays an important part, and the only explanation of the upper *karewas* is that Kashmīr was formerly occupied by a vast lake of which the existing lakes are remnants. Mr. Drew estimated that at one period this lake must have reached a level of nearly 2,000 feet above the present height of the valley, but this estimate is considered far too high by Mr. Lydekker. No very satisfactory conclusions can be drawn at present as to the barrier which dammed the old lake, or as to the relative period of its existence.

137

Botany.

A full account of the flora of Kashmīr is given by Lawrence, *Valley of Kashmir*, chap. iv. The valley has an enormous variety of plants, and the Kashmīrī finds a use for most of them. Among condiments the most important is the *zīra sīyāh* (*Carum sp.*), or carraway. Under drugs, *Cannabis sativa*, the hemp plant, and *Artemisia* or *tsuwan* may be mentioned. Asafoetida is found in the Astor *tahsīl*. Numerous plants yield dyes and tans, of which *Datisca cannabina*, *Rubia cordifolia*, and *Geranium nepalense* are the most familiar. Kashmīr is rich in fibres, and the people make great use of them. The two best are the *Abutilon Avicennae* and the *Cannabis sativa*. *Burza* (*Betula utilis*), the paper birch, is a most important tree to the natives. The bark is employed for various purposes, such as roofs of houses, writing paper, and packing paper. Many of the ancient manuscripts are written on birch bark. The Kashmīrī neglects nothing which can be eaten as fodder. The willow, the Indian chestnut, the cotoneaster, the hawthorn, and the poplar are always lopped to provide fodder for cattle and sheep in the winter.

Excellent grasses abound, and the swamps yield most nutritious reeds and other plants. There is an abundance of food-plants, too numerous to be enumerated here. *Euryale ferox*, *Nymphaea stellata*, *N. alba*, *Nelumbium speciosum*, the exquisite pink water-lily, *Acorus Calamus*, and *Typha sp.*, the reed mace, all contribute to the Kashmīrī's sustenance. Wild fruits are in profusion, and many fungi are eaten by the people. The mushroom is common, and the *morel* (*Morchella sp.*) abounds in the mountains and forms an important export to India. There are plants that are useful for hair-washes, and the herbs with medicinal properties are almost innumerable. *Macrotomia Benthami* is one of these peculiarly esteemed by the Kashmīrīs as a remedy for heart-affections. Among the scents may be noted *Gagal dhup* (*Juniperus macrocephala*), which

•137 is largely exported to India, where it is used by the Hindus. The most important of the aromatic plants is the *Saussurea Lappa*. This grows at high elevations from 8,000 to 9,000 feet. The root has a scent like orris with a blend of violet. It is largely exported to China, where it is used as incense in the joss houses. It has many valuable properties, and is a source of considerable revenue to the State. There is a great variety of trees, but the oak, the holly, and the Himálayan rhododendron are unknown. Among the long list of trees may be noticed the *deodár*, the blue pine, the spruce, the silver fir, the yew, the walnut, and the Indian horse-chestnut. In the valley itself the exquisite plane-tree, the mulberry, the apricot, and the willow are perhaps the most familiar.

Fauna. 136 Kashmír offers great attraction to the sportsman, and for its size the valley and the surrounding mountains possess a large and varied animal kingdom. A full account of the animals and birds will be found in *The Valley of Kashmir*, chap. v. Since that book was written game preservation has made great strides, and has prevented the extinction of the *Sbrazingha* (*Cervus duvaucelii*) and *hangul* or Kashmír stag (*C. cashmirianus*). Among the *Cervidae*, the musk deer (*Moschus moschiferus*) is common and its pod is valuable. Of the family *Ursidae*, the black bear, or *homba hápat* (*Ursus torquatus*), is very common, being a great pest to the crops and a danger to the people. The brown bear, or *lál hápat* (*Ursus arctus* or *isabellinus*), is still far from rare. It is partly herbivorous and partly carnivorous. Of the family *Bovidae*, the *márkhor* (*Capra falconeri*) and the ibex (*C. sibirica*) are still to be met with. The Kashmír *márkhor* has from one to two complete turns in the spirals of its horns. The *takr* or *jagla* (*Hemitragus*) is found on the Pír Panjál, and the serow or *rámu* (*Nemorhaedus bubalinus*) is fairly common. The *goral* (*Cemas goral*) also occurs.

There is a considerable variety of birds. The blue heron (*Ardea cinerea*) is very common, and fine heronries exist at several places. The heron's feathers are much valued, and the right to collect the feathers is farmed out. Among game birds may be noticed the snow partridge (*Lerwa lerwa*), the Himálayan snow cock (*Tetraogallus himalayensis*), the *chikor* partridge (*Caccabis chukar*), the large grey quail (*Coturnix*), the *monal* pheasant (*Lophophorus refulgens*), the Simla horned pheasant (*Tragopan melanocephalum*) and the Kashmír Pucras pheasant (*Pucrasia biddulphi*). The large sand-grouse (*Pterocles arenarius*) is occasionally seen. Pigeons, turtle-doves, rails, grebes, gulls, plovers, snipe, cranes, are common, and stork

2x Imperial Gazetteer G-3 (1889-95) 1909 AVI Kashmir AVI
Kashmiri AV4

Ki
231
655
283

surprising. The industry is no longer confined to Kothar, but has spread all over the valley, and its further progress depends on the maintenance and extension of mulberry trees.

Ten filatures have been built, containing 1,800 basins for reeling cocoons, fitted with Italian machinery and giving employment to over 5,000 people in Srinagar. The quality of the silk steadily improves, and it now commands a price very slightly below Italian silk. In 1897 only 406 ounces of eggs were imported, while in 1906 the import was 27,500 ounces. The number of *sanatdārs* taking seed has risen in the same period from 150 to 14,000, and the weight of cocoons reared from 375 to 21,400 maunds, while the payments to the rearers increased from Rs. 4,300 to Rs. 3,28,500, all the eggs and mulberry leaf being given free of cost. The total production in 1905–6 was 109,072 pounds of raw silk, and 43,349 pounds of silk waste. The profits since 1897, when the industry was started on a scientific basis, have been 15·4 lakhs, of which 4·6 lakhs were made in 1905–6. The total capital outlay has been Rs. 7,25,000, while the working expenses are about 7 lakhs a year.

Kv
137
313
[459]

Forests.

The forests of the State are extensive and valuable, and their conservation is of great importance in the interests of the country drained and irrigated by the rivers passing through them. Including the Bhadarwāh *jāgīr*, which contains the finest quality of timber, the area is reported as 2,617 square miles of all kinds, comprising *deodār*, firs, pines, and broad-leaved species. This may be divided into the drainage areas of the Jhelum (1,718 square miles), Chenāb (806), and Rāvi (113). The *deodār*, which is the most valuable species, extends between 5,000 and 9,000 feet above sea-level, and is at its best between 6,000 and 9,000 feet. The blue pine appears at about 6,000 feet, and extends to nearly 10,000 feet, the finest specimens being found mixed with *deodār*. A zone between 8,000 to 11,000 feet is occupied by silver fir, which occurs pure in dense forests at the lower elevation and is mixed at greater heights, first with maple and then with birch. Forest vegetation above 11,000 feet consists of dwarf rhododendron and juniper.

Deodār.

The total area under *deodār* is about 543 square miles. In the Kashmīr Valley it is found principally, indeed almost entirely, in the north-west—that is, the district known as Kāmrāj—and the largest areas are in the Utr Machipur *tahsīl*. In Udhampur district, which includes the Kishtwār and Padar *tahsīls*, there are 198 square miles of *deodār*-bearing tracts situated on the Chenāb and its affluents. These forests are of

137
313

a very good class, containing many fine trees of 12 to 18 feet girth, and the reproduction is mostly good. In the Muzaffarábád district, which contains the valley of the Kishangangá river and that of the Jhelum from Kohála nearly up to Bárámúla, there are estimated to be 158 square miles of *deodár* forest. Rámnagar, formerly the *jágír* of the late Sir Rájá Rám Singh, K.C.B., contains a very small proportion of *deodár* forest, and it has been generally overworked. Finally, the Jasrota district, situated on the right bank of the Rávi river, contains a small area of *deodár* in the Basoli *tahsíl*. These forests also were formerly held in *jágír* and were practically denuded of all mature trees, so that no fellings can take place for many years to come.

Pines and firs.

Pines and firs occupy about 1,100 square miles, and *chil* (*Pinus longifolia*) 473 square miles. The last is found in lower altitudes below the blue pine and *deodár*, existing in practically pure forests in Muzaffarábád, Bhimbar, Rámnagar, Udhampur, Jammu, and Jasrota. The Kashmír Valley, having a lowest elevation of 5,200 feet above sea-level, contains no *chil*. The Bhimbar Forest division (and district) has the greatest area under *chil* (220 square miles), situated principally in the Kotli and Naoshera *tahsils*. Some of these forests are of very fine quality, and will in time give a large number of mature trees for sale, but at present they are not being worked. Next to this comes the Rámnagar division, which includes part of the Jammu district; but these forests are badly stocked and have been overfelled, and will take many years before they can be of much value as a commercial asset. The Chenáb division, which also comprises part of the Jammu district, has some forest of poor quality. In Udhampur most of the forest is too far from a market to be profitable. When good cart-roads or light railways have been made, it may be possible to utilize the Bhimbar and Jammu *chil* forests for the distillation of turpentine, but at present the cost of carriage is prohibitive.

Next come the fir forests. Owing to their altitude, it would naturally cost more to extract their timber; and the selling price of fir being very low, these forests are unworkable except in the Kashmír Valley, where the timber is used as firewood mainly for the silk factory at Srínagar. Perhaps in the future, when artificial preservation of the timber in the form of sleepers, &c., by creosoting, has been resorted to, these forests will prove of great value.

Miscellaneous.

Lastly, there are the forests of broad-leaved species, and these are at present only of value in the Kashmír Valley for the supply of firewood to the city of Srínagar. Bamboos

e Imperial Gazetteer G-3 (1889-95) 1909 AV1 Kashmir Δv1

re found mainly in the Jasrota district on the Rāvi river, here there are about 3,200 acres of mixed forest which ontain the so-called male kind (*Dendrocalamus strictus*). They are saleable at a good price, but are at present subject o much injury from the Gūjar tribes, who hack them for fodder or their cattle. The grass areas are mostly blanks inside *deodār* and other forests, which are used as grazing-grounds y the villagers. 137 313

In the Kashmīr Valley the forests supply timber and fire- Production. wood for local use and also logs for export. During the past ew years *deodār* sleepers have been exported down the Jhelum iver, the sleepers paying very well, though the quality is not o good as in other districts. Little *deodār* is used in Srīnagar n comparison with blue pine, which, being both very durable nd cheaper than *deodār*, is the favourite building material. From Udhampur both logs and sleepers of *deodār* are exported down the Chenāb to Wazīrābād. The trees being of better quality, higher prices are obtained for the produce than or that of Kashmīr. From Muzaffarābād timber in the log nd sawn into sleepers is exported down the Jhelum. The leepers are entirely of *deodār*, but logs of both blue and long-eaved pine are also sent down in small quantities. These three istricts, Kāmrāj, Udhampur, and Muzaffarābād, give the reater part of the forest revenue, which amounted to 9·8 lakhs n 1904-5, while the expenditure was 3 lakhs. 313 438

Up to the present, owing to the weakness of the forest Improve- establishment, little has been done in the matter of artificial ments. eproduction of *deodār*, nor is it necessary. Owing to the pro- ective measures already taken, the three important species, *leodār*, blue pine, and the long-leaved pine, are rapidly filling p blanks in the forests. The reproduction of *deodār* by atural means, whether in Kashmīr, Udhampur, or any other istrict, is remarkable, nor is the blue pine at all backward, hile in the Kotlī and Naoshera *tahsīls* of Bhimbar district he restocking of blanks inside and outside the forests is all hat can be desired. Since the last great seed year of 1897 myriads of self-sown *chīl* have appeared and are now fine ealthy plants, ranging from 6 to 9 inches in height, so that nless destructive fires occur there is little or nothing to be one in the matter of restocking denuded areas or blanks. o far fire protection has been unnecessary and hardly any- hing has been expended on it, and the only parts protected re the Kotlī *tahsīl* forests. The greatest need at present protection from the damage done by graziers. 313

4: Durand G-3 (1888-93) 1900 AV1 Kashmir AV1

133 The journey up the river, though it offers many
137 beautiful views, is monotonous, and it is a relief to get out of your boat occasionally and to walk along the bank ahead of the men towing, or to cut off bends of the river by striking across country. In the spring the banks of the Jhelum are bordered for miles by broad bands of purple iris, with an occasional mass of the white iris showing the village graveyard; the air is delightful, and breathes new life into any one who has come up from the burning plains of India. When tired of walking there is nearly always a clump of the great plane-trees, or a single one growing on the river bank, to give the wayfarer pleasant shade, where he can sit and wait for his boat, sung into day-dreams of home in the far West by a chorus of sky-larks.

341 Srinagar itself is picturesque as approached by boat. The town, a huddled mass of lightly-built houses, in the construction of which timber takes a prominent part, lines both banks of the river. It is dominated by two isolated hills, one crowned with the battlements of the State prison and fortress called Hari Parbet, the other the Takht-i-Sulaiman, or Throne of Solomon, topped by an ancient temple which has looked down on the crowded life below for many centuries, for it was built before the secret of the true arch was known. Behind these hills rise the rugged outlines of the mountains which form the boundary of
[411] the valley. As your boat ascends the stream it passes under bridge after bridge of wood built out from massive wooden piers on timber cantilevers, and the bank is lined with temples, whose roofs, covered with tin, shine like silver. Ruined quays, retaining

4: Durand G-3 (1888-93) 1900 AV1 Kashmir AV I

At Bandipur we were met by two officials of the Kashmir State, who had been deputed to accompany me—the one with strict injunctions never to lose sight of me for a moment wherever I might go, the other with orders to see me as far as Gilgit. A guard of twenty Kashmir sepoys, Dogras of one of the best regiments, had also been told off as my escort. I had, in addition, four Pathan orderlies belonging to my regiment, the Central India Horse. They were picked men of tried gallantry, true as steel, worthy of the implicit trust I placed in them. The baggage of the party was carried by coolies, the roads not being suitable for animal transport.

The second of the Kashmir officers was a charming companion, a Hindoo gentleman of the old school, who had passed much of his life at the Kashmir Court. Bright, always cheerful, with a supreme contempt for the savage people among whom we were to spend our time, and also it must be allowed for the beauties of their wild country, he invariably saw the amusing side of life, and was ready to extract some fun out of the difficulties and mishaps of frontier travel. We became the greatest friends, and spent hours in endless talk. The last time I saw him his humour was a trifle gruesome. He came to take leave of me, and told me with much glee how the Brahmin astrologer whom he had consulted about his return to Kashmir had fixed the lucky day for his start, but had not been able to foresee his own departure on a longer journey. The unfortunate man had died of cholera that morning.

From Bandipur the road runs straight out of the valley over the Tragbal pass, the highest point of

4: Durand G-3 (1888-93) 1900 AV1 Kashmir AV1

which is about twelve thousand feet. Our first camp was at an altitude of over nine thousand feet in a glade in the pine forest, the turf covered with blue forget-me-nots. The march up was lovely, through one succession of copses of jasmine and scented wild rose, the latter of all colours from white to dark red. Close to the camp we came on the first signs of the army which had preceded us—a line of graves of men who had died of cholera. The troops and coolies were said to have suffered much from this scourge, and we arranged to avoid their camping grounds in future. The following morning we continued our march, the road winding up through pine forest till the rounded tops of the watershed were reached. We halted for an hour at the top, surrounded by a wilderness of flowers, blue gentian, anemones, acres of white and yellow blossoms bordering the wreaths of snow, masses of small pink alpine flowers, wild rhubarb and sorrel in profusion, and patches of dwarf juniper, for we were well above the pine and birches. The views from here are lovely—to the left, steep pine-clad slopes descend into the famed Lolab valley, behind, stretched out thousands of feet below, lie the valley of Kashmir and the blue sheet of the Woollar Lake, backed by the snowy range of the Pir Panjal; to the right stand the great square peak and snow-fields of Haramukh; in front, a hundred miles away, towers Nanga Parbat, from which on both hands as far as the eye can reach tossed ranges patched with snow fill up the picture.

I had an example on reaching camp this day of the extraordinary carrying power of the Kashmiri coolie; my tent was late coming up, and when it

4c Durand G-3 (1888-93) 1900 AV1 Kashmir AV1

were lent to the Durbar for this purpose by Government. The villagers are no longer liable to be dragged out for forced labour if they do not satisfy the extortionate demands of tax collectors and plundering officials. But it will take many a long year before the Kashmiri becomes a man.

The next few marches are up the valley of the Kishengunga, one of the most beautiful in Kashmir. The road runs for the most part near the river, through fir forest and thickets of deciduous trees and bushes, amongst which the white Persian lilac and wild roses show in great profusion. At the lower end of the valley is a splendid grove of branching poplars, beyond which, near Gurais, are a few miles of open cultivation and stretches of meadow land. The steep hill sides for the most part, however, close in on the river; the slopes facing north covered with forest, those facing south bare of trees but grass grown, as is usual in the Himalayas, where the summer sun burns up the southern exposed slopes too much to permit of young woods growing. The mountains rise in grand peaks, broken into precipices hung with fir and birch, and interspersed with alpine meadows.

The height of the Gurais valley is about eight thousand feet, and the climate as near perfection in spring, summer, and autumn as can be found on earth. We habitually marched early for the sake of the coolies, starting any time after four or five, stopping to breakfast at some tempting spot, where we would spend most of the day reading or wandering off the road in search of views and game, and finally reaching camp some time in the afternoon. It was the existence of the nomad, the charm of which once tasted

6:Spate N-4 (no date)1954 AWI India
Kashmir AVI
Pir Panjal

133

Fig. 64.—Poonch to Ladakh: Block Section of Kashmir Himalayas. Line of confluence; vertical exaggn 2·5. Geology (based on de Terra) diagrammatic: 1, Siwaliks; Permian-Cretaceous) in NE; 4, older Palaeozoic; 5, younger Palaeozoic (gneiss); 6,

and Wadia considers it as the front of a great Kashmir nappe. The massive Permo-Carboniferous limestones, metamorphics, and intrusives form a broad swelling platform at about 13,000 ft, on which lies a serrated residual crest, the highest monadnocks reaching 15,500 ft. The passes lie as a rule at 11,000–12,000 ft.

The contemporary glaciation presents interesting features. Most of the thirty-odd small glaciers are on the Nn slope, in contrast to the Himalayas farther E where there is relatively little ice on the arid Tibetan side. The Pir Panjal snow, however, comes mostly in winter, from W or NW, and the Sn aspects are more exposed to warm air-currents from the plains. Only one or two of these glacierets have real valley tongues, the lowest at 11,600 ft; most of them are simply cakes of ice in wide cirques which form the collecting grounds. The river-pattern is very striking, with the great bends of Chenab and Jhelum (the latter controlled by the syntaxis), the tributaries at these bends carrying on the line of the lower main streams, and a general lay-out of feeders suggesting that the drainage was originally to the SE.

[137] The Sn flank is wetter than the Nn, but slopes here are so often too steep for soil formation that the larger coniferous forests are mostly to the N. The SOI 1. 1/2,000,000 maps carry the Pir Panjal across the Chenab, the upper (Chandra Bhaga) Valley being closely inset in the angle of the Pir Panjal and the main Himalaya. The lower levels of this high basin (6000–12,000 ft) in the W carry a fair population; the density of Udhampur Dt is 48, and unlike the rest of Jammu it increased slightly from 1931 to 1941. The climate here is definitely cold, "the mango-tree gives place to the apple"; but terraced irrigation is not too difficult, and rice is important.

[161]

[187] The region is, however, essentially negative, a barrier. Of the routes into the Vale the most direct is the old Mogul road by the Pir Panjal Pass (11,400 ft), which gives its name to the range. This is now of little importance, the main entry (in normal times) being by the motor road up the

6:Spate N-4 (no date)1954 AWI India
Kashmir AVI
Vale of Kashmir

The climate is naturally continental, the severity of the winter being increased by drainage of cold air down the encircling slopes, and by radiation. Srinagar lies at 5200 ft and its climate is more extreme than that of hill stations lying 2000 ft higher on the outer Himalayan ridges:

Fig. 63.—Kashwas of the Vale of Kashmir. 1, mountain outliers (forest in S, grass or rock in N); 2, *karewas*; 3, marsh; 4, grass; 5, alluvial cone; 6, willows, poplars, orchards; 7, stream beds; 8, irrigation channels (*kuls*); 9, *demb* cultivation; 10, springs. All blank areas cultivated except ravines and flanks of *karewas* (cf. Fig. 66). Altitude about 5200 ft along Jhelum, 5800 on upper margins of *karewas*, 6000–7000 on hills. This map does not represent any specific area.